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olution, has just been assigned to the dissimilar histories of Mignet and Thiers. The points of view, under which a thing may be contemplated, are as diversified as mind itself. The most honest inquirers after truth rarely come to precisely the same results, such is the influence of education, prejudice, principle. Truth, indeed, is single, but opinions are infinitely various ; and it is only by comparing these opinions together, that we can hope to ascertain what is truth.

ART. V. — *Elementary Geology.* By EDWARD HITCHCOCK, Professor of Chemistry and Natural History in Amherst College, and Geologist to the State of Massachusetts. Amherst : J. S. &. C. Adams. 1840. 12mo. pp. 320.

AN extract from the Preface of the work before us, will best show the objects which its author proposes to accomplish.

"1. It is arranged in the form of distinct propositions or principles, with definitions and proofs ; and the inferences follow those principles on which they are mainly dependent. 2. An attempt has been made to present the whole subject in its proper proportions, viz. its facts, theories, and hypotheses, with their historical and religious relations, and a sketch of the geology of all the countries of the globe that have been explored. 3. It is made more American than republications from European writers, by introducing a greater amount of our geology. 4. It contains copious references to writers, where the different points, here briefly discussed, may be found amply treated. 5. It contains a *Palæontological Chart*, whose object is to bring under a glance of the eye the leading facts respecting organic remains."

These are excellent traits in an elementary treatise on geology ; and, however slightly acquainted with the science, a reader cannot fail to perceive that it is here presented not only in a new but in a very attractive form, enabling the author to condense into a convenient compass, the vast amount of facts accumulated by his own personal observation, or derived from an extensive and minute knowledge of the labors of distinguished geologists. Professor Hitchcock has been too long and favorably known to scientific men, both of the new world and of the old, to make it necessary for us to say, with what ample qualifications he undertakes the task before him. His work is no "secondary formation," based on the published works of European writers, but in every part bears the impress of acute and original observation, and happy tact in presenting the immense variety of subjects treated in the following sections, into which the book is divided.

"Section I. A general account of the constitution and structure of the earth, and of the principles on which rocks are classified. Section II. The chemistry and mineralogy of geology. Section III. Lithological characters of the stratified rocks. Section IV. Lithological characters and relative age of the unstratified rocks. Section V. Palæontology, or the science of organic remains. Section VI. Operation of aqueous and atmospheric agencies in producing geological changes. Section VII. Operation of organic agencies in producing geological changes. Section VIII. Operation of igneous agencies in producing geological changes. Section IX. Connexion between geology and natural and revealed religion. Section X. The history of geology. Section XI. Geographical geology."

The work is illustrated with numerous wood-cuts, which, though substantially they answer the purpose intended, must be owned to be generally of a very inferior description. Indeed we cannot but say, that the whole mechanical execution of the work is altogether beneath the importance of the matter contained in its pages. Many of the cuts resemble the first rude essays in the art of wood engraving; and, in too many places, the typography is equalled only by some bad impressions of a penny paper. We consider excellence in these things of the highest importance in a work intended, like the present, for an elementary class-book. We shall regret it as much as the author himself, if his second edition comes not to us clothed in the best style of the American press. We ask for no more, and the intrinsic merit of the work demands no less.

But to return to its contents. The first section closes with a tabular view of all the systems of classification of rocks, which have been prepared by the great lights of modern geology. This table cannot fail to be of especial use to the student.

It is a thread, guiding him out of a labyrinth. Professor Hitchcock does not implicitly follow any one system, but he arranges the stratified rocks into groups or systems, nearly corresponding to those of Professor John Phillips. These systems he disposes under the terms Alluvian, Diluvian, Tertiary, Secondary, and Primary, not because he "feels satisfied with these terms ; but chiefly because they have become so incorporated with geological descriptions, that their use is still convenient, and but little liable to lead the learner astray ; especially if he be forewarned against the hypothetical intimations which they contain." Yet another reason for using them is, that "there does exist in nature a ground for grouping together the rocks in some analogous manner."

Passing over the second, third, and fourth sections, all of which are executed in a manner to interest the general reader, and reward the diligent student, we arrive at the fifth, which is devoted to the science of Organic Remains. It occupies one fourth of the whole work, and is illustrated with the best cuts in the book. We venture to say, that there is not in our language so neat and compressed, yet so clear and correct, an account of the "wonders of geology." From its nature, Palæontology will ever be, as it has always been, the most popular and attractive portion of geology. We walk with our author in the Zoological Garden founded ages before the creation of man. He points out the gigantic plants of other days, uncages the great beasts, and "draws out with a hook the great leviathans." We almost hear their deep expirations, and witness the flapping of tails and fins in the "death flurry" of huge Saurians. We walk on the shore of an ancient ocean, collecting shells in countless variety. We bend our course inland, and are awed by the stupendous deposits of the siliceous shields of microscopic animalcula, or lost in admiration at foot-prints of gigantic birds. The American student, in this department of geology, has too long been referred to foreign localities for examples of these lost tribes. Professor Hitchcock has peculiarly "Americanized" this part of his subject. His own labors and discoveries in this department of geology mark an epoch in the science, though his modesty does not allow him to put forth that claim to merit, which all true sons of science willingly accord to his labors. He has not permitted himself to state, with its true fulness and force, a claim to the original invention of the ingenious and interesting "*Palæontological Chart*," which accompanies this portion of his work. But the merit of original conception is not the less his, because he happened subsequently to learn that something akin to it was contained in Professor Brown's "*Lethea Geognostica*," a work which he received after the account of his own chart was in type. We hope, that among the many works devoted to science, which issue from the Amherst Press, under his eye, we shall soon see, not only the chart of Professor Brown, but also the five folio colored lithographs of the Structure of the Earth, by Professors Noeggerath and Burkart.

We must refer our readers to the "Elementary Geology," not only for a "Synoptical View of the Fossil Footmarks," which are classed under the name of ICHNOLITES, and divided into several orders by our author, but also for information, as full and satisfactory as the present state of knowledge permits, on the character of organic remains; the nature and process of petrifaction; the means of determining the nature of organic remains, and their classification; their amount in the earth's crust; their distribution; and the account of the periods when different animals and plants began to appear, or when they became extinct. These, and their various allied subjects are discussed with a fulness which leaves the general student nothing to desire, and are followed by a series of inferences from the mass of facts, equally interesting and logical. It is here that we feel how truly Baconian, how full of fruit and progress, is the philosophy of modern Geology.

We cannot, however, agree with our author in the proof of his thirteenth inference, stated on page 161. We coincide wholly with the conclusion, "that the greater part of the accessible crust of the globe may once have constituted portions of the animal frame." In proof of this, Professor Hitchcock says, "In respect to limestone, which has been thought to constitute about one-seventh of the earth's crust, the presumption in favor of its animal origin seems quite probable." We were disposed, on the first reading, to understand that "animal origin" referred to animal secretion, or, in the words of Mantell, lime "had passed through the complex and wonderful laboratory of life." The idea, however, of Professor Hitchcock seems to be, that animals have the power of *forming lime.* It is repeated on page

245, where "the cause why less lime is found in the older rocks" is said to be, that "probably it was then less in quantity, since it would seem to be derived in part, at least, from organic beings, which did not then exist." Again, on page 263, speaking of the soil in the earliest habitable state of the earth, our author pronounces it almost "destitute of calcareous matter." The inference here is in keeping with the "animal origin" to which we have referred. This "origin," then, is creation. Now we do not believe that the author intends to convey any such impression; yet his language conveys no other. And this is a doctrine at variance with all sound science. Whatever lime existed at the creation, exists now. "What was in the beginning" of elementary substances, exists now; as much now as then, neither more nor less; having the same properties and relations, obeying the same immutable laws of chemical combination. Its *form* only has changed. Animals have the power of changing these forms, of selecting and rearranging the primitive elements, but no power of producing them. We trust, that in a new edition the words "animal origin," and the other passages to which we have referred, will be so qualified as not to be subject to be understood as conveying ideas opposed to experience and to sound philosophy.

The sixth section is to us, who are dwellers upon diluvial drift, even more interesting than that at which we have last glanced. It is also still more "Americanized" than the preceding one, by the description and discussion of diluvial agency, and the vast amount of facts in our own geology, which our author here presents. This chapter will command the attention of foreign geologists, and for some time to come, we venture to predict, will form their text-book on this new and interesting department of inquiry; and American geologists are under the greatest obligations to our author for this succinct statement of his views upon a subject, to which we believe he first called their attention, and which he has done so much to elucidate. It is this section, more than any other, which impresses us with the necessity of original American works like the present; and, though it be "elementary," it contains a full account of all that is yet known of diluvial agency. We cannot present to our readers the author's account of the theories upon this subject; our limits preclude this specimen of his matter and manner.

The causes of diluvial agency are wrapped in mystery. On no subject in geology is there such a diversity of opinion. No theory is perfectly satisfactory ; all are partial in their application. The theories, and the arguments for and against them, are stated with great candor ; and we perfectly agree with the author in his conclusion, "that the philosophical and unprejudiced mind will infer that the time has not yet arrived for forming a complete theory on this subject ; and, therefore, that it is best to keep the mind open to the facts and reasonings from all quarters." — p. 202.

We are truly glad to find that Professor Hitchcock has incorporated, in his eighth section, the doctrines respecting Geine and Geates, first published by him in his "Report on the Reëxamination of the Geology of Massachusetts." It shows how firm is his conviction of the correctness of his Report, notwithstanding the attempts which have been made to discredit the existence of any such proximate principle as geine, and, of course, the fallacy of all doctrines relating to it. With a mind ever open to conviction, in that happy "philosophical and unprejudiced" state to which he refers, we doubt not our author will be ever among the first to relinquish doctrines which appear to him unstable ; but till then, we quote for the benefit of our readers who may not have seen his longer "Report," the following account of geine and geates. Speaking of the agency of plants, he observes ;

> "When a complete decomposition takes place, a compound called *geine* is the result. If acted upon by an alkali, it assumes acid properties ; and then combines with earths, alkalies, and oxides, forming neutral salts, which may be called *geates*. And, in fact, most of the geine in soils exists as geate of alumina, of lime, of magnesia, of iron, and manganese. It is these geates, with some geine, in an uncombined state, mixed with the detritus derived from the disintegration of rocks, and which are mostly silicates, that form soils, and especially vegetable mould. These geates and geine are more or less soluble in water, and in that condition are taken up by the rootlets of plants, and form a large part of their nourishment." — p. 206.

The remaining sections sketch, with the hand of a master, the more general questions of geological dynamics. We cannot forbear quoting the remark which follows the results of the experiments and reasoning of Fourier, on the temperature of the earth and planetary space. It is a new epitaph, chiselled on the monument of Bowditch.

> "These results of Fourier require the application of very profound mathematical investigations. And it may not be amiss to mention, that the late lamented Dr. Bowditch informed me, that he had followed Fourier, through all his intricate analyses of the subject, and that the reasoning was entirely conclusive." — p. 236.

ART. VI.—1. *Speech of* Mr. H. S. LEGARÉ, of South Carolina, *on the Bill imposing Additional Duties as Depositaries, in certain Cases, on Public Officers*, delivered in the House of Representatives of the United States, October, 1837. Washington: Office of "The Madisonian." 8vo. pp. 32.

2. *Speech of* Mr. WISE, of Virginia, *on the Subject of the Late Defalcations*, delivered in the House of Representatives, Dec. 21, 1838. Washington: Office of "The Intelligencer." 8vo. pp. 32.

3. *Speech of* Mr. DUNCAN, of Ohio, in the House of Representatives, April 10, 1840, *on the Bill making Appropriations for the Civil and Diplomatic Expenses of the Government, for the Year* 1840. Washington: "Globe" Office. 8vo. pp. 20.

THERE are few things in this age and country of reform, more urgently demanding correction than the style of our *Congressional* debates. In the American halls of legislation, it is not unnatural to expect to find eloquence of a high character. No stimulus to the power of speech could well be greater than is furnished to him, who discusses the interests of a great people, for the conviction of those whose votes are to be decisive of its policy. A perfectly unrestricted freedom of deliberation exists. The body is, or ought to be, select, both branches numbering together less than three hundred members; most of whom, also, must needs have had abundant previous practice, as, in consequence of the electioneering usages of the greater portion of the country, its representatives must have spoken their way to their seats.